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The careful consideration of this subject seems also to be well adapted to throw light upon some of the more hidden questions of practical mechanics. The principles upon which his theory was based are, that the whole amount of resistance is measured by the amount of change of form, of compression, or of vibration with which the rolling surfaces are left; and these are themselves dependent upon the nature of the surfaces as yielding or hard, elastic or inelastic, and upon the amount of pressure and the extent of the surface of contact.

The subject was further discussed by Mr. C. Jackson, Jr., Mr. Treadwell, and the President. Mr. Treadwell concurred with Professor Peirce in his views, except that he was inclined to attribute the loss of force, in the case of elastic bodies, rather to the slow recovery by the particles of their previous position, than to their vibrations.

Dr. Holmes exhibited the peculiar bone corpuscles shown and described by him to the Boston Society for Medical Improvement in the year 1847, together with one of the drawings of them taken at the same period, by Mr. McIlvaine, under his direction. These corpuscles, remarkable for their regular, sharply defined, and often yellowish nucleus, are found in the cancellated structure of human bones. They are identical with those described by M. Robin in the *Gazette Médicale* for December 22, 1849, under the name of medullary cells.

Professor Peirce referred to a paper on the subject of heat, formerly prepared by Mr. U. A. Boyden, and expressed a desire that it might receive the attention of the Rumford Committee.

Three hundred and forty-fourth meeting.

March 4, 1851. — MONTHLY MEETING.

The PRESIDENT in the chair.

Professor Peirce made some remarks respecting the name to be assigned to the new planet, and thought it should be called Clio, rather than Victoria.

Mr. W. C. Bond expressed his preference for the latter name, because it had already been given to the new planet by the English astronomers.

Professor Peirce continued his remarks on the subject of the loss of force in friction, which he attributed in great part to vibration. He thought that the rising and falling of the moving body, occasioned by superficial asperities, could produce but a very small part of the loss that actually occurs.

The President stated that the rising and falling of the moving body would cause loss of force by increasing the space traversed by it.

Mr. Bowen suggested that heterogeneous attraction must take place in friction, and be one source of this loss of force.

Professor Lovering remarked that adhesion would increase with smoothness, and friction with asperities of surface.

Professor Treadwell concurred with Mr. Bowen in attributing a loss of force to incipient or partial cohesion.

Mr. Whitney communicated some statistical facts respecting the increased annual products of silver and gold. He thought that the relative value of those metals is destined to undergo a great change.

Mr. W. C. Bond communicated a letter from Colonel Sabine, and an extract from a letter sent by Dr. Holland, both addressed to Mr. Everett, and giving information that the British government had decided on continuing the Observatory at Toronto.

Colonel Sabine having requested specific information as to the wishes of the Academy in regard to the observations to be made, it was

"*Voted*, That the subject be referred to the committee formerly appointed to take charge of it, and that that committee be empowered to conduct the necessary correspondence.

Mr. W. C. Bond communicated a letter from Hon. William Mitchell of Nantucket, giving an account of the occultation of Aldebaran on July 16, 1849, of which the following is an extract: —

"On the 16th ultimo, I was prepared with a five-foot equatorial instrument of four-inch aperture, and an excellent chronometer by Parkinson and Frodsham. My assistant was furnished with a forty-two-inch Dolland, of three-inch object-glass, and a chronometer by Robert Roskell. The error and rate of my chronometer were obtained by the sun's meridian passage at the previous and the succeeding noon, and confirmed by the meridian passage of Antares on the following evening. With this chronometer that used by my assistant was compared before and after the occultation, and no change detected. The immersion, as observed by myself, occurred at $9^{h.}$ $30^{m.}$ $49^{s.}$. The time noted by my assistant was $9^{h.}$ $30^{m.}$ $50^{s.}$, and the mean of these results, namely, $9^{h.}$ $30^{m.}$ $49^{s.}.5$ may be deemed the true mean time at the meridian of my observatory.

"At this immersion of Aldebaran, I witnessed for the third time the singular phenomenon of the projection of the star on the bright limb of the moon. The other instances occurred, first on the 16th of July, 1830, and again on the 30th of August, 1831. In the present case the appearance of the star between my eye and the moon was so decided, that a thread of the moon's disc was manifest east of the star, and the star seemed to plunge into the surface of the moon. But this position was assumed by the star instantaneously, and not progressively, as sometimes supposed. The star occupied this position nearly two seconds, strictly one second and seven tenths.

"This illusion, for such it must be called for the want of a better explanation, is well worthy of the consideration of astronomers. In the immersion of other stars of the first magnitude, I have not witnessed it, nor have I met with it in the observations of others.

"Is this unaccountable appearance peculiar to this star? Whether it be so or otherwise, no inquiry can interest astronomers more than the solution of this mystery."

Mr. W. C. Bond also communicated a letter from Colonel J. D. Graham, giving an account of the transit of Mercury on the 8th of May, 1845, at Castle William, on Governor's Island, in New York harbor.

"The observations of Major Graham, in which he was assisted by Lieutenant Thom, were made with a forty-six-inch achromatic telescope constructed by Simms, having an aperture of two inches and three fourths, with a power of sixty, shaded by an orange glass. This

telescope was mounted on an equatorial stand obtained from the Messrs. Blunt of New York. The instrument was mounted in the parapet of the castle, and was placed for shelter against the wind under the lee of the north wall of the upper tier. The interior contact of the planet at ingress had passed before the instruments were ready for use, on account of some unexpected difficulties which delayed the preparation. An observation was taken of the time when the second limb of the planet had passed within the sun to an extent equal to its own diameter, as nearly as the eye could judge. The correct or reduced sidereal time, as noted by the sidereal chronometer (No. 2419), was $2^{h.}\ 35^{m.}\ 25^{s.}$. The correct or reduced mean time, as noted by the mean solar chronometer (T. Dallas 158), was $11^{h.}\ 29^{m.}\ 59^{s.}.9$, civil account. The transit, at the egress of the planet, was observed with great satisfaction. For this purpose the instrument was removed from the parapet, and placed on a large flat slab of granite standing on the ground. It was first observed when the planet was within the sun's disc by a space equal to its own diameter. The time by the sidereal chronometer was $8^{h.}\ 54^{m.}\ 26^{s.}$, and by the solar chronometer, $5^{h.}\ 47^{m.}\ 58^{s.}.4$ P. M. The next observation was on the interior contact. The time was satisfactorily observed to be $8^{h.}\ 57^{m.}\ 30^{s.}.7$ sidereal time, and $5^{h.}\ 51^{m.}\ 3^{s.}.2$ solar time. Immediately after this observation, perhaps two seconds of time, the whole disc of Mercury, appearing perfectly round, seemed to be within the sun's disc again. There was an apparent connection between the limbs of the sun and Mercury by a little black stem of the same color as the planet. This stem appeared, when first seen, as long as one fifth or one sixth of Mercury's diameter. It remained distinct for thirty-three seconds of mean time, when, by a gradual diminution, it disappeared; thus forming a second apparent internal contact, at $8^{h.}\ 58^{m.}\ 6^{s.}.4$ sidereal time, and $5^{h.}\ 51^{m.}\ 38^{s.}.4$ solar time. The disappearance of the planet from the sun's disc was watched with great satisfaction and distinctness, until it became like the finest black dot hanging on the exterior edge of the sun. The total disappearance took place at $9^{h.}\ 0^{m.}\ 59^{s.}.6$ sidereal time, and $5^{h.}\ 54^{m.}\ 31^{s.}.4$ mean solar time.

"The chronometers were regulated by equal altitudes of the sun, taken on the 7th and 8th of May, with an eight-inch sextant made by Troughton and Simms, and an artificial horizon sheltered by a glass roof in the usual way."

The Corresponding Secretary read a letter from the As-

sistant Secretary of the Smithsonian Institution, offering to transmit for the Academy, free of expense, to any part of Europe, publications delivered at Washington; and also to deliver, free of expense, at Washington, any publications intrusted to its agents in Europe.

On motion of Mr. Treadwell, it was

"*Voted*, That the Corresponding Secretary be directed to present the thanks of the Academy to the Smithsonian Institution for its obliging offer."

Dr. C. T. Jackson communicated the results of his analysis of a crystal of phosphate of lime from Hurdstown, New Jersey: —

"This crystal has a pale lemon-yellow color, and possesses a resplendent lustre on the surface, resembling the glazing produced by heat on a semi-fused mineral. Its specific gravity is 3.205. By analysis it was found to consist of

Phosphate of lime	92.405
Chloride of calcium	0.540
Peroxide of iron	0.040
Oxide of manganese	0.003
Fluoride of calcium, by difference, . . .	7.012
	100.000

"It is, therefore, identical with apatite, and nearly of the same composition as that from Capo de Gata in Spain. Its formula will be $3\ Ca_3\ P + Ca\ (Cl\ F)$.

"This mineral occurs in large quantities at Hurdstown, and is now extracted from the mine for use in agriculture; it has been also employed in England in the manufacture of earthen-ware. The presence of fluorine in most, if not all, native phosphate of lime, was remarked upon at a former meeting of the Academy, and its agricultural importance was then indicated."

Three hundred and forty-fifth meeting.

April 1, 1851. — MONTHLY MEETING.

The PRESIDENT in the chair.

Lieutenant Davis presented a paper, relating to the deterio-

ERRATA.

Insert "as observed" before "at Castle William," sixth line from the bottom of page 259.

Instead of a dash before "potash," page 271, eighth line from the bottom of the page, substitute a comma after that word.

Substitute a period for the note of admiration on page 285, twelfth line.

The experiment exhibited by Mr. Guyot, and described on page 284, where it is credited to Professor Snell, is identical with that performed by M. de Maistre in 1832, of which an account is given in Peltier's work, "Des Trombes," page 11.